

REMARKS

Claims 1- 45 are all the claims pending in the application, claims 37-45 having been added to claim the disclosed invention more clearly.

As a preliminary matter, the undersigned gratefully acknowledges the courtesies extended by the Examiner in the May 17, 2004, telephone interview on this matter. Relevant topics discussed during the interviews are set forth below.

The newly added claims 37-45 recite features that are included in previous versions of the claims of the present application, and therefore have already been considered by the Examiner. As such, this amendment raises no new issues requiring further consideration or search. Entry of these new claims is believed proper and is respectfully requested.

Applicant acknowledges with appreciation that claims 1-6, 9, 17-19, 21-31 and 34 have been allowed over the prior art of record, and that the remaining claims would be allowable upon resolution of the formal matters under 35 U.S.C. §112.

Claims 35 and 36 stand rejected under 35 U.S.C. §112, first paragraph, as failing to comply with the written description requirement. Claims 7, 8, 10-16, 20, 32, 33, 35, and 36 stand rejected under 35 U.S.C. §112, second paragraph, as being indefinite. Applicant requests reconsideration and allowance of the pending claims in view of the following arguments.

SUBSTANCE OF INTERVIEW

Pursuant to M.P.E.P. § 713.04, Applicant provides the following remarks concerning the May 17, 2004, telephone interview on this matter. Applicant discussed the rejection to claims 35 and 36 under 35 U.S.C. § 112, first paragraph. Applicant remarked that the “single-gate” feature recited in these claims is disclosed in the originally filed application, and in particular, in the

language of claim 11. The Examiner acknowledged Applicant's position, and requested that additional details be submitted in a response to the present Office Action. The Examiner further remarked that claims 35 and 36 appeared inconsistent with the terminology used in their respective independent claims 1 and 30. Applicant addresses this issue in the remarks presented below.

Rejection Under 35 U.S.C. §112, First Paragraph

The Examiner has rejected claims 35 and 36 under 35 U.S.C. §112, first paragraph. In the Office Action, the Examiner indicated that the present application fails to disclose an embodiment in which the modulation photogate and the accumulation gate are the same gate. Applicant respectfully disagrees and submits that this particular feature is described in claim 11 of the originally filed application. More specifically, claim 11 recites charges q_a and q_b that are to be read out directly as voltage or as current.

Applicant first notes that to read out charges q_a and q_b as voltage necessarily requires a high impedance input at the electronic readout circuit immediately behind the accumulation gates. This in turn results in a strong capacitance coupling between the modulation photogates and the respective accumulation gates. Thus, from an electronic point of view, there is actually no difference between a single electrode (combining the accumulation gate and the modulation photogate) and separate, but capacitively coupled electrodes.

One reason why a single gate works in the same way as two separate gates is because the respective devices are not really active as detectors (that is, not detecting impinging light and yielding an electric signal in proportion to the amount of impinging light), but rather as mixers (that is, the signals are proportional to the product of the modulation voltage and the modulation of the

impinging light). In addition, the present device would be completely “blind” when only exposed to light or any electromagnetic radiation (that is, yields a zero-signal), unless the radiation is modulated and the modulation is directly related to the modulation of the voltage applied to the respective gates.

During the interview the Examiner remarked that claims 35 and 36 appeared inconsistent with the terminology used in their respective independent claims 1 and 30. Specifically, Mr. Luu indicated that the independent claims appear to require the modulation photogate and the accumulation gate to be separate gates since these gates are defined by different formulas.

Applicant respectfully submits that claims 35 and 36 are consistent with the terminology used in their respective independent claims 1 and 30. For example, claims 1 and 30 recite modulated photogate voltages that are applied to the modulation photogates, as well as taking off charges occurring on the accumulation gates. If the accumulation gates and modulation gates are the same gate (as they are in claims 35 and 36), then both these actions (applying voltage and taking off charges) occur on same gate. The single-gate aspect is functional because the system acts as a mixing device such that the direct modulation of the combined modulation and accumulation gate is further superimposed by varying amounts of charges generated in response to the modulated impinging electromagnetic waves.

In addition, the claim 1 limitation, “in which charges q_a and q_b which have drifted to the respective accumulation gates G_a and G_b are taken off,” is still consistent for a combined accumulation and modulation gate. For example, the charges are still generated within a space charge zone of the same gate which exceeds and surrounds the volume of the gates themselves, and drift from this zone toward the combined modulation and accumulation gate.

Based upon the foregoing, Applicant submits that the combined modulation and accumulation gate feature of claims 35 and 36 is indeed disclosed in the application as originally filed. Accordingly, Applicant requests that the rejection under 35 U.S.C. § 112, first paragraph, be withdrawn.

Rejection Under 35 U.S.C. §112, Second Paragraph

The forgoing amendments to claims 7, 8, 10-16, 20, 32, 33, 35, and 36 are believed responsive to the points raised by the Examiner in this rejection. However, Applicant provides the following comment. Concerning claims 35 and 36, the Examiner requested clarification as to how parent claims 1 and 30 would be affected if the modulation photogate and the accumulation gates are the same gate, such that different voltages are applied to these gates. Applicant has addressed this issue in the remarks presented above. Accordingly, Applicant requests reconsideration and withdrawal of the rejection to claims 7, 8, 10-16, 20, 32, 33, 35, and 36.


Lastly, Applicant acknowledges that claims 37-45 have not been formally rejected because they are being submitted in the instant Amendment. However, these claims are also believed to be patentable at least by virtue of their dependence on patentable claims, as presented above.

CONCLUSION

Applicant believes that the Examiner's rejections have been overcome and submits that the subject application is in condition for allowance. Should any issues remain unresolved, the Examiner is invited to telephone the undersigned attorney.

Respectfully submitted,

RUDOLF SCHWARTE

By: 
Lawrence A. Maxham
Attorney for Applicant
Registration No. 24,483

Dated: May 21, 2004

THE MAXHAM FIRM
750 'B' STREET, SUITE 3100
SAN DIEGO, CALIFORNIA 92101
TELEPHONE: (619) 233-9004
FACSIMILE: (619) 544-1246